

Moving at the Speed of Sound: Scientific Innovation in Auditory Research

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I recently evaluated a young woman as a candidate for possible cochlear implantation. Later that week, I read a detailed account of her appointment with me on her online blog. Several days later, I ran into another patient of mine, an 11-year-old girl with bilateral cochlear implants,

while shopping for groceries. Her parents told me that they posted videos of her activation appointments for anyone to view online on YouTube. Through Twitter, individuals worldwide describe new events, breakthrough discoveries, and medical outcomes in short real-time bursts of text—tweets, that is—at such a fast rate that regular news agencies now report on tweets that are coming in. I have had several patients and students correspond with me through Facebook, and many patients that I encounter seem to have completed recent graduate studies on auditory neuroscience at Google University.

All of this digital activity, in which I gladly participate, makes me uneasy if I stop to think about it. The direct accessibility of information; the immediate, unfiltered publication of medical and scientific viewpoints; and the willing distribution of this information by consumers worldwide have huge ramifications for how we conduct scientific research and deliver patient care. We are as likely today to see questionable scientific claims made by unqualified

individuals as we are to have valid medical opinions publicly shot down by frustrated patients on an online forum. It seems in this age that anybody with a computer is now entitled to provide their opinion of material that they are not necessarily qualified to judge and that, indeed, an entity such as the Internet is not subject to peer review or editorial correction. Yet despite my uneasiness, I cannot help but realize that there is no turning back. The world is smaller today than it was yesterday, and this trend will unrelentingly continue.

With these thoughts in mind, I question the ways in which scientific material is distributed today. In an era in which information evolves daily and travels instantaneously, why do we continue to invite authors to contribute to a textbook that is published months to years after the contributions are prepared? How can we improve the process by which scientific data collected are distributed publicly? Why perpetuate a system of scientific funding that encourages already having completed the experiments proposed in the grant application, thereby prolonging the period between data analysis and distribution? Clearly we need to reevaluate our methods of scientific communication in the digital age in which information can be distributed in seconds, rather than months. Yet we would be foolish to dispense entirely with the deliberate, methodical ways in which we have acquired and shared information for years. It seems that we are at a crossroad. Although the Internet may never be subject to the guidance of an editor-in-chief, I suspect that the cream will continue to rise to the top in this age of information overload. Now that we can routinely perform Einstein-like time compression to accomplish in seconds what used to take weeks, it may be more important than ever that we apply filters based on objective data, rational evaluation of the facts, and conservative appraisal of the potential impact of a

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scientific finding. Science has progressed in this fashion thus far not because of the limited speed of the printing press but because it takes time and effort to accumulate a solid understanding of a complex issue.

This is not to say that we should backtrack. Rather, as in good science, we need to embrace progress despite our cautiousness. We need to hope for a breakthrough even though we may remain skeptical about its nearness. After all, the first hearing aids and cochlear implant were once wildly innovative projects that were initially received with a cautiousness that seems more fearful than substantive in hindsight. It is with this attitude in mind that I read the excellent review article presented here by Dr Hubert Lim on the topic of auditory midbrain implants—certainly a topic worthy of invoking skepticism, fear, cautiousness, and hope all at once. It is extremely easy to raise valid concerns when confronted by such a topic, yet these concerns may one day appear similar to those of individuals who once felt that personal computers would become just a passing fad. Our responsibility, instead, is to be critical for the sake of getting things right rather than for displaying a flair for criticism. Whether or not we are comfortable with the direction and speed

of technology should not prevent us from rejecting it blindly. Rather than being left behind as the generation that does not know how to send a text message, we need to figure out why texting has become so widespread. With innovation in the auditory sciences, the stakes are naturally high, as our primary responsibility is ultimately to help individuals with auditory deficits. If we can make exciting progress and do so safely, then there are very few limits to what we should be willing to ponder. I view the work being done by Lim and colleagues as yet another example of how we are learning to provide artificial stimulation to the auditory system so that hearing impaired individuals may have a chance to hear. This work will one day provide the groundwork for further refinements in central auditory stimulation, and I would not be surprised to learn of a Twitter tweet announcing that scientists can now put an ear in the middle of the brain! Like all innovative work, the limitations and benefits of these intriguing approaches will become clearer as techniques become perfected over time and our experience with this technology grows. Until then, I will continue to applaud the efforts of those that perform bold research that makes me uneasy, for the sake of getting it right.